Statistical Bulletin
METROPOLITAN LIFE INSURANCE COMPANY
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Factors in Perinatal Mortality

THE problem of perinatal mortality, for many years formidable and challenging, has been accentuated by the high level of births in the past decade. In 1954, there were about 137,400 perinatal deaths reported in the United States. Of this total, 70,100 were fetal deaths of 20 or more weeks gestation and 67,300 were babies dying within one week of birth. Some progress has been made in reducing the perinatal mortality rate—it fell about one third between 1940 and 1954—but the improvement has lagged far behind that for maternal mortality, which decreased 86 percent in the same period.

Various factors contribute to the death toll in the perinatal period.* One of the most important is lack of early and adequate prenatal care. Such care makes possible early detection of adverse conditions, which may in many cases be corrected, or where this is not possible, measures can be taken to protect the mother and child. Yet, a sizable proportion of women, particularly those who have already borne children, still fail to seek medical care early in pregnancy. A recent study in Iowa† showed that nearly one quarter of the women having their first baby and nearly half of those having a fourth or subsequent child had received no prenatal care during the first three months of pregnancy.

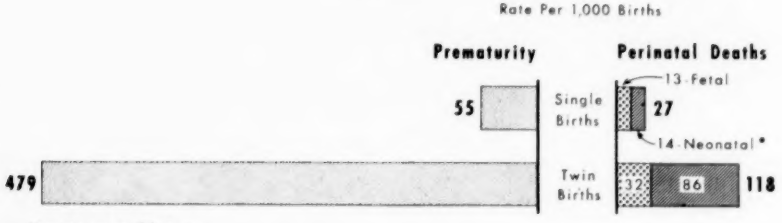
Plural births are subject to a considerably higher perinatal mortality than single births. The Iowa study showed that the fetal death rate for twins was 2½ times that for single births—even though such deaths among twins appear to be greatly underreported; the neonatal death rate among twins was 6 times that for single births, as may be seen in the chart on page 2. The high perinatal mortality for plural births reflects largely the high frequency of prematurity among them.

Pathological conditions in the

*The article, "Perinatal Mortality," in the April 1956 issue of the *STATISTICAL BULLETIN* outlined the general scope of the problem and some of the factors involved, based chiefly upon analysis of vital statistics records. The present article deals with information on more specific factors from recent clinical studies.

†Donnelly, M. M., "The Influence of Multiple Births on Perinatal Loss," *American Journal of Obstetrics and Gynecology*, Vol. 72, p. 998, November 1956.

INCIDENCE OF PREMATURITY AND PERINATAL MORTALITY IN SINGLE AND TWIN BIRTHS
Iowa 1953-54



*Deaths up to 28 days.

mother adversely affect the survivorship of the babies. A classical example is the high perinatal mortality among babies of diabetic mothers, which still persists to a large extent even with careful medical supervision during pregnancy and management of delivery, and with special measures for the newborn. For example, Joslin Clinic experience for 1936-51 showed a perinatal mortality of 16 percent among babies of diabetic mothers.

Similarly, puerperal toxemia is generally associated with a high rate of perinatal loss, especially before birth. In a study covering the period 1931 through 1945,* the total perinatal loss in the presence of toxemia was about one third; most of these deaths were stillbirths or undelivered babies. Although the perinatal death toll associated with puerperal toxemia has since been reduced substantially, it is still relatively high.

Infectious disease in the mother, even when the infection is mild, may play a role in perinatal mortality. This is indicated in a recent study in England† of women admitted to a hospital for delivery. In a group of 99 mothers who showed no evidence of infection, all the babies were born alive and none died during the first week, whereas in a control group of 137 women with evidence of infection, there were 15 perinatal deaths. The prognosis for the infant was considerably poorer when the mother had a protracted fever.

While modern surgical techniques have made Cesarean section quite safe for the mother, it is still attended with high risk to the infant, particularly in the face of complications of pregnancy, including prematurity. Nevertheless, expert consensus is that fetal mortality in these cases and in Cesarean section generally can be reduced appreciably. This applies even to the very large group in which the indication for Cesarean section is the delivery of a previous baby by this method, although the fetal mortality in such cases is lower

*Chesley, L. C., Somers, W. H., and Vann, F. H., "A Further Follow-up Study of Eclampsia," *American Journal of Obstetrics and Gynecology*, Vol. 56, p. 409, September 1948.

†Smith, J. A. M., Jennison, R. F., and Langley, F. A., "Perinatal Infection and Perinatal Death," *The Lancet*, p. 903, November 3, 1956.

than in cases where the procedure is used because of other reasons.

In the South, particularly among nonwhite women, the use of midwives is still fairly common, and in a residual number of cases the mother is unattended at delivery. The mortality occurring under these circumstances is obscured by the fact that the death may not be reported or that cases developing complications are often admitted late to a hospital, and the fatalities are reported as hospital deaths.

The high death toll among infants both before and soon after birth can be reduced through the wider application of present knowledge and the development of new knowledge regarding the factors affecting fetal and infant viability. It is of prime importance that women be educated to seek prenatal care early and to remain under continuous medical supervision throughout pregnancy. In the course of prenatal instruction, women should be alerted to signs and symptoms that may indicate impending complications. It is primarily the responsibility of physicians to see that prenatal instruction of mothers is adequate. It is also the responsibility of the medical profession to improve standards of obstetrical practice and, where deliveries by midwives are still frequent, to cooperate with health authorities in raising their standards of practice. Better knowledge of the physiology of respiration and management of the premature on the part of those attending the birth can help to prevent many deaths from asphyxia of the newborn and from prematurity. Such measures will bring closer the goal of reducing perinatal mortality by about one third—the proportion considered preventable even with present knowledge. Inasmuch as understanding of many of the factors in perinatal mortality is still rudimentary, there is great need for research in this field. A key figure in this program is the pathologist with special training in the basic problems affecting fetal life.

Why Children Are Hospitalized

THE incidence and duration of hospitalization among the dependent children of Metropolitan Life Insurance Company office and field personnel insured under the Company's Group insurance program was described in the February issue of the STATISTICAL BULLETIN.* The present article deals with the types of surgery performed on these children and the nonsurgical causes for which they were hospitalized. The data relate to claims involving at least one night of hospital stay on which first payment was made during 1954 or 1955.

*"Hospitalization of Young People," page 7. According to a recent survey among the married male personnel of the Company, 71 percent had dependent children under age 19 (the age group selected for this survey), and the average number of such children per married male was 1.5.

Annual rates of hospital admission for surgical conditions are shown in Table 1. For all surgical causes combined, the rate for males was 46 per 1,000 and for females about 39 per 1,000 at ages under 20 years. Males recorded the higher admission rates throughout childhood, but the excess decreased from 55 percent at ages 0-4 to only 16 percent at ages 10-14; the disparity was little at ages 15-19. In each sex, the hospitalization rate for surgery was at a peak in the age group 5-9.

Tonsillectomies and adenoidectomies accounted for nearly half of the operations performed on the hospitalized children under age 20; the proportion exceeded two thirds under age 10. The annual admission rate for such operations among

TABLE 1—TYPES OF SURGERY IN HOSPITALS ON PATIENTS UNDER AGE 20

Dependent Children of Metropolitan Life Insurance Company Personnel*

Claims With First Payment in 1954 or 1955 Traced to April 1, 1956

Type of Surgery	Annual Hospital Admissions per 1,000 Dependents					Average Duration of Hospital Stay per Case, Days				
	0-19	0-4	5-9	10-14	15-19	0-19	0-4	5-9	10-14	15-19
	Males									
All Types	46.2	38.7	69.3	33.3	36.1	3.9	4.3	2.6	4.6	6.5
Nose and throat	22.7	18.1	48.2	7.6	5.6	1.6	2.0	1.3	1.6	1.9
Tonsils or adenoids	21.9	17.4	47.5	7.4	4.1	1.4	1.3	1.3	1.5	1.8
Eye and ear	2.2	2.0	3.4	1.2	1.5	3.7	3.2	3.4	2.6	*7.1*
Abdomen	7.6	6.9	5.8	10.0	8.9	6.9	7.8	5.8	6.8	6.8
Appendix	4.0	.4	3.5	8.1	6.0	6.6	*7.4*	6.5	6.4	7.0
Hernia	2.9	5.2	2.1	1.4	2.2	5.9	5.8	4.9	6.9	7.2
Infections and traumata	2.2	1.5	2.4	2.7	2.4	3.6	2.8	3.7	4.6	2.9
Benign tumors and cysts	1.3	1.0	.6	1.4	2.9	4.1	2.5	2.0	3.1	6.8
Fractures	3.1	1.3	3.1	4.8	4.3	5.6	7.9	5.6	4.3	6.5
All other types	7.1	7.9	5.8	5.6	10.5	7.4	6.7	7.3	6.0	9.5
	Females									
All Types	38.8	25.0	62.5	28.7	35.6	3.5	4.1	2.6	3.8	5.7
Nose and throat	21.6	13.7	44.1	11.7	8.7	1.5	1.4	1.3	1.6	3.2
Tonsils or adenoids	20.7	13.6	43.7	11.3	4.6	1.3	1.4	1.3	1.4	1.6
Eye and ear	2.1	1.9	3.7	1.1	.9	3.5	4.1	3.3	2.9	3.4
Abdomen	5.8	2.4	5.4	7.3	11.3	6.8	8.3	5.6	6.2	7.6
Appendix	4.5	.5	4.1	6.3	10.8	6.7	12.6	5.9	6.2	7.2
Hernia	.7	1.2	.9	.4	—	4.5	3.8	4.6	7.0	—
Infections and traumata	1.5	1.3	1.5	1.5	1.7	5.6	2.2	9.1	5.4	5.1
Benign tumors and cysts	1.3	1.0	1.0	1.0	3.0	3.3	3.4	3.1	2.0	3.8
Fractures	2.0	.7	2.8	2.9	1.9	4.6	6.6	4.3	2.2	8.8
All other types	4.5	4.0	4.0	3.2	8.1	8.3	11.6	7.6	7.5	6.2

*Personnel in Pacific Coast States and Canada not included.

Note: Italic figures are based upon fewer than 10 cases.

TABLE 2—NONSURGICAL CAUSES FOR HOSPITALIZATION UNDER AGE 20

Dependent Children of Metropolitan Life Insurance Company Personnel*

Claims With First Payment in 1954 or 1955 Traced to April 1, 1956

Nonsurgical Causes	Annual Hospital Admissions per 1,000 Dependents					Average Duration of Hospital Stay per Case, Days				
	0-19	0-4	5-9	10-14	15-19	0-19	0-4	5-9	10-14	15-19
	Males									
All Causes	23.2	31.1	19.4	19.1	20.7	8.7	7.9	7.0	8.6	14.5
Diseases of respiratory system	6.2	10.7	4.5	4.0	3.9	6.0	6.0	5.1	6.7	6.9
Infectious and parasitic diseases	1.8	2.4	1.4	1.3	1.7	7.7	6.8	7.8	9.7	7.8
Diseases of digestive system	3.4	4.8	3.4	2.4	1.9	4.9	5.4	3.2	3.5	10.7
Diseases of genito-urinary system	.7	.1	1.2	.6	1.0	14.1	3.0	12.1	9.8	24.0
Diseases of the skin	.8	1.2	.6	.7	.5	7.0	9.8	3.8	4.7	5.3
Congenital malformations	1.4	4.3	—	.2	—	18.6	19.3	—	2.5	—
Accidental injuries	3.1	1.7	2.8	4.3	4.6	4.4	2.6	3.8	4.3	6.8
All other causes	5.8	5.9	5.5	5.6	7.1	13.7	6.9	11.3	16.0	25.8
	Females									
All Causes	20.0	29.2	15.6	14.6	17.6	9.1	7.7	5.9	12.7	14.9
Diseases of respiratory system	5.8	10.6	4.4	2.8	3.0	5.8	5.5	6.0	5.9	6.8
Infectious and parasitic diseases	1.4	1.3	1.6	1.1	1.7	8.0	7.3	5.9	13.3	8.2
Diseases of digestive system	2.8	3.9	1.8	2.6	2.6	5.4	5.9	4.8	5.9	3.9
Diseases of genito-urinary system	1.3	1.2	1.5	1.5	.9	5.3	4.6	4.3	7.3	5.4
Diseases of skin	.4	.6	.4	.3	.6	5.4	5.5	6.0	4.5	5.0
Congenital malformations	1.4	4.0	.1	.1	.4	17.5	19.0	2.0	1.0	2.0
Accidental injuries	2.4	2.5	2.4	2.1	2.4	3.9	3.9	3.1	2.7	6.8
All other causes	4.5	5.1	3.4	4.1	6.0	17.4	7.4	9.2	29.5	31.7

*Personnel in Pacific Coast States and Canada not included.

Note: Italic figures are based upon fewer than 10 cases.

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males, for example, rose sharply from about 17 per 1,000 under age 5 to nearly 48 per 1,000 at ages 5-9, then decreased rapidly during the next decade of life. At ages 10-19, appendectomies were the leading type of surgery among males; among females this was so only at 15-19 years, tonsillectomies and adenoidectomies still outranking all other types of surgery at ages 10-14. Other relatively common causes of surgical intervention among the children in this study included fractures, diseases of the eye and ear, and hernias. Accidental injuries were responsible for a larger proportion of the surgical cases than is evident from Table 1, which shows the type of surgery performed, not the cause. Thus, all fractures, a large proportion of the infections and traumata, and some cases in the residual group were of accidental origin.

For nonsurgical conditions as a

group the hospital admission rate was only about half that for surgical conditions; as Table 2 shows, the rate under age 20 was 23 per 1,000 for males and 20 per 1,000 for females. Preschool children had the highest hospitalization rate for nonsurgical causes, in part because of the frequency of respiratory disease cases. Among both boys and girls at ages under 5, the diseases of the respiratory system accounted for about one third of the cases hospitalized for nonsurgical causes. Although the admission rate for these diseases was appreciably lower beyond the preschool ages, they outranked all the other causes at every age group among females, and among males at ages 10-19 were second only to accidental injuries. The other relatively frequent causes of hospitalization were diseases of the digestive system, congenital malformations, and infectious diseases other than respiratory.

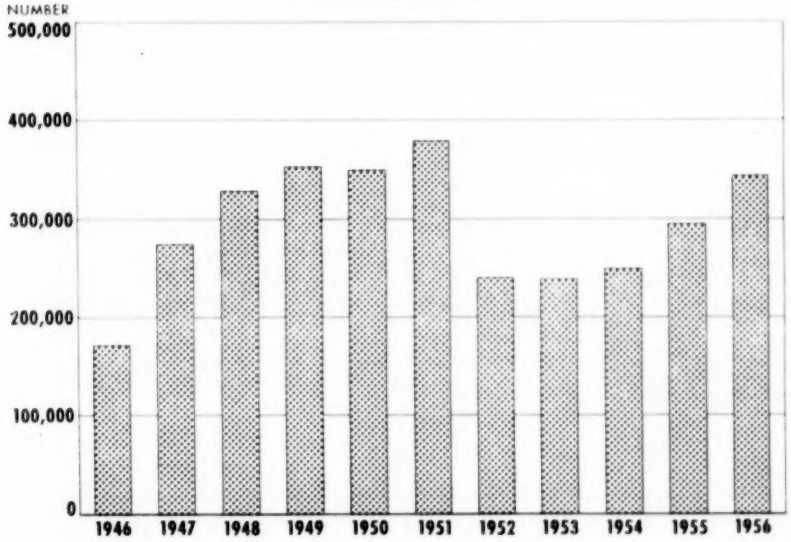
The average duration of hospitalization for children admitted because of nonsurgical conditions —8.7 days per case for males and 9.1 days for females — was more than twice that for surgical conditions; the details are given in the right-hand panel of the tables. Children hospitalized for congenital malformations stayed an average of about 18 days; for diseases of the respiratory system, the average was 6 days, and for accidental injuries about 4 days. The average hospital stay was less than 1½ days for tonsillectomies and adenoidectomies, the most common type of surgery among children under 20. For appendectomies, the second most frequent cause of surgery, the average was nearly 7 days.

Current Pattern of Immigration

A RELATIVELY large number of migrants have entered the United States in recent years. From 1946 through 1956, net civilian immigration added about 3.2 million persons to our population, accounting for about one ninth of our total population increase during the past 11 years. The annual gains from migration are shown in the accompanying chart; the figures allow for alien admissions to, and departures from, continental United States, as well as for the movement of American citizens from Puerto Rico and elsewhere.

Our annual population increase from immigration climbed from 170,000 in 1946 to a peak of about 380,000 in 1951. Although the gains have been smaller since then, they have remained above 238,000 each year, and reached as high as 344,000 in 1956. Various groups of immigrants have contributed to the recent stream of newcomers. After the close of World War II, the influx was augmented by the admis-

ANNUAL POPULATION INCREASE FROM CIVILIAN MIGRATION
United States, 1946-1956



Source: Bureau of the Census, *Current Population Reports*, P-25, No. 153.

sion of nearly 120,000 wives and children of servicemen. In the past few years, and particularly in 1956, thousands of immigrants have come in under the Refugee Relief Act, which provided for 209,000 special quota-exempt visas between August 7, 1953 and December 31, 1956. Admissions in 1957 have already been swelled by the entry of Hungarian refugees. In fact, since November 1956 more than 32,000 of them have come to our country and additional ones continue to be admitted. Throughout the postwar period, net in-migration from Puerto Rico has averaged close to 40,000 annually.

Some characteristics of the immigrant aliens recently admitted to the United States are shown in the table on page 8. Reflecting the special entry provisions for wives of citizens and of resident aliens, females have outnumbered males in each of the postwar years. About two thirds of the newcomers were persons aged 18-49 years, and nearly one fourth of the total were children under 18 years of age.

Persons of European origin have constituted the majority of our postwar immigrants, as they had throughout our history. However, their proportion of the total is now considerably below that of decades ago. In fact, during 1953-56 not quite two fifths came from conti-

CHARACTERISTICS OF IMMIGRANT ALIENS ADMITTED

United States, 1946-1956

Year Ended June 30	Percent of Total Admissions During Specified Period							
	Male	Ages			Area of Last Permanent Residence			
		Under 18	18-49	50 and Over	British Isles	Continental Europe	Canada	Other
1946-49*	37.2	17.0	70.9	12.1	18.1	39.7	15.2	27.0
1950-52*	47.5	24.5	63.7	11.8	7.2	66.6	11.3	14.9
1953	42.9	24.4	66.9	8.7	10.3	36.0	21.3	32.4
1954	45.9	24.3	67.3	8.4	8.5	34.0	16.8	40.7
1955	47.1	24.9	67.4	7.7	7.0	37.7	13.6	41.7
1956	48.6	26.3	66.1	7.6	6.2	41.1	13.2	39.5

*The figures for 1946-49 and 1950-52 refer to the periods July 1945 through June 1949 and July 1949 through June 1952, respectively.

Source of basic data: U. S. Immigration and Naturalization Service.

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nental Europe, and less than one tenth from the British Isles; by contrast, in most years prior to World War I their combined proportion was at least nine tenths.

A considerable number of our alien arrivals since the end of World War II have been drawn from our closest neighbors. More than three quarters of a million have left other American countries for ours, with about two fifths of this number coming from Canada, one fourth from Mexico, and one eighth from the West Indies. Only a very small part of our immigrants come from Asia, Africa, or Australia.

Fatal Injuries in Sports

THE loss of life from accidental injuries sustained in sports is greater than is generally realized. Among Metropolitan Life Insurance Company Industrial policyholders, aged 10-64 years, there were more than 800 deaths in sports during the three years 1953-55. Males comprised 92 percent of the victims, reflecting the fact that many more males than females engage in sports, particularly the more hazardous ones, and that males are much more often willing to expose themselves to danger.

The table on page 9 shows the number of insured lives reported lost in various sports during the three-year period under review. The variations in death toll arise for the most part from differences in the number of participants in

NUMBER OF DEATHS FROM SPECIFIED SPORTS ACCIDENTS

According to Activity of Person. Ages 10-64 Years
Industrial Policyholders, Metropolitan Life Insurance Company,* 1953-55

Type of Activity	Number of Deaths		Type of Activity	Number of Deaths	
	Both Sexes	Males		Both Sexes	Males
Total	809	747	Hunting	90	89
Water sports	380	343	Firearm accidents	71	70
Swimming	249	224	Drowning	19	19
Wading or playing in water	85	73	Boat accidents	16	16
Diving from piers, banks, springboards, etc.	40	40	Other than boat accidents	3	3
Sports diving	4	4	Target shooting	8	8
Water skiing	2	2	Ice skating	8	7
Boating	148	130	Football	5	5
Motor or rowboat	128	110	Climbing high cliffs, mountains, etc.	5	4
Canoe	11	11	Horseback riding	4	3
Raft	6	6	Baseball	3	3
Sailboat	3	3	Basketball	2	2
Fishing	153	150	Boxing	1	1
Boat accidents	99	96	Golf	1	1
Drowning (excluding boat) and others	54	54	Ice boating	1	1

*Exclusive of the Pacific Coast States and Canada.
Note: These figures exclude injuries sustained by military personnel or in professional sports.

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the individual sports and are not to be interpreted as measuring the comparative hazards associated with the various activities.

Water sports accounted for nearly half the deaths in this study. Of the 380 drownings in such recreational activities, 249 were due to swimming, 85 to wading or playing in the water, and 40 to diving. The remaining few fatalities resulted from sports which have become popular in recent years—diving with oxygen tanks and masks, and water skiing behind speed boats. Details available from the death claim records indicate that many of those who drowned were either poor swimmers or nonswimmers, or expert swimmers who attempted distances beyond their ability. Placing too much reliance on inflated tire tubes was a factor in several of the drownings. Nearly two thirds of all the water sports victims were in the age group 10-19 years.

Pleasure boating was responsible for close to a fifth of the deaths in sports. Accidents of this type involved mainly motor-driven craft or rowboats, but canoeing, playing on rafts, and sailing also contributed to the total. Although weather conditions were a factor in some of the accidents, most of the boating mishaps were caused by occupants shifting positions, by overloading, and other dangerous practices.

Fishing accounted for a slightly

higher death toll than pleasure boating; of the 153 victims, all but three were males. Virtually all the fatal fishing accidents were drownings, which occurred under a variety of circumstances: while the victim was out on a boat, when he slipped into the water or inadvertently stepped from shallow to deeper areas, or when he fell into the water from banks, bridges, or other high places. All age groups suffered a goodly number of deaths, reflecting the popularity of fishing.

As would be expected, the large majority of the 90 lives lost in hunting accidents resulted from firearm injuries. The most common causes of such injuries were walking into the line of fire, mistaking a hunter for game, and the faulty handling of weapons. An appreciable number of hunters were drowned, either while using boats or while wading along river banks.

Every sport has its hazards. There were eight fatalities in target shooting, all among boys. A like number of persons lost their lives because they skated on ice too thin to bear their weight. Such diverse sports as football, baseball, horseback riding, and mountain climbing also claimed their toll of life.

Company's Exhibits at the Annual American Medical Association Meeting

Physicians attending the annual session of the American Medical Association in New York City, June 3 to 7, are cordially invited to visit the Metropolitan Life Insurance Company booths in the Scientific Exhibit.

VALUE OF STRESS TESTS IN DETECTING CORONARY DISEASE

Prepared in cooperation with Colonel T. W. Mattingly, M.C., U.S.A., and the Walter Reed Army Hospital. A clinical and statistical evaluation, based upon a long-term follow-up of military personnel and of applicants for Life insurance suspected of having coronary disease who were given the double standard (Master) two-step exercise test; some military personnel, in addition, were given the anoxemia (Levy) test. (Space 1105)

A NEW FOCUS: PERINATAL MORTALITY

This exhibit presents statistics pointing out the importance of perinatal mortality as an obstetrical and pediatric problem, the major contributing factors, and suggestions to reduce the mortality rate during late gestation and the first days of life. (Space 136)

MORTALITY FROM SELECTED CAUSES

Industrial Policyholders, Metropolitan Life Insurance Company
March 1957

Cause of Death	Annual Rate per 100,000 Policyholders*				
	March		Year to Date		
	1957†	1956	1957†	1956	1955
All Causes	721.5	676.4	689.9	679.3	672.4
Tuberculosis (all forms)	7.7	7.9	7.5	7.8	8.6
Communicable diseases of childhood	.4	.4	.3	.4	.4
Acute poliomyelitis	.1	.1	‡	.2	.2
Malignant neoplasms	148.2	129.2	141.1	131.3	132.5
Digestive system	51.7	42.9	48.9	44.1	45.3
Respiratory system	20.9	18.1	19.6	18.0	17.0
Diabetes mellitus	16.3	18.0	15.0	17.0	16.2
Diseases of the cardiovascular-renal system	391.9	364.3	375.4	366.2	362.6
Vascular lesions, central nervous system	76.4	72.6	71.5	71.6	69.7
Diseases of heart	285.3	264.8	275.3	268.0	265.0
Chronic rheumatic heart disease	13.4	12.4	12.6	12.6	14.3
Arteriosclerotic and degenerative heart disease	219.2	209.1	212.5	210.1	202.9
Diseases of coronary arteries	122.7	118.1	120.6	119.7	116.1
Hypertension with heart disease	41.4	35.2	38.9	36.5	38.4
Other diseases of heart	11.2	8.1	11.4	8.8	9.4
Nephritis and nephrosis	9.4	7.5	9.2	8.2	10.0
Pneumonia and influenza	19.4	19.7	18.9	20.8	20.3
Complications of pregnancy, childbirth	1.1	1.1	1.0	.9	1.0
Suicide	6.3	5.5	5.9	5.4	6.0
Homicide	2.8	2.2	2.8	2.0	2.2
Accidents—total	33.4	34.8	33.7	37.3	33.3
Motor vehicle	14.4	14.7	14.1	16.1	13.4
All other causes	93.9	93.2	88.3	90.0	89.1

*The death rates prior to March 1956 relate to persons insured under Industrial premium-paying policies and persons with Ordinary Monthly Premium Policies for Less Than $1,000; beginning with March 1956, included also are persons with Debit Book Ordinary policies for $2,000 or less.

†The death rates for 1957 are provisional.

‡Less than 0.05.

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Correspondence relating to the BULLETIN may be addressed to:
The Editor
STATISTICAL BULLETIN
Metropolitan Life Insurance Company
1 Madison Avenue, New York 10, N. Y.

MORTALITY FROM ALL CAUSES

INDUSTRIAL POLICYHOLDERS · METROPOLITAN LIFE INSURANCE COMPANY

(DEC)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1956	7.0	6.5	6.8	6.8	6.4	6.2	5.9	5.9	5.7	6.1	6.0	5.9
1957	6.8	6.7	7.2									

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